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IMPACT OF INDUSTRY AND INDUSTRY POSITION ON IT FOCUS: AN ALTERNATIVE IT VALUE MODEL

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Abstract

This paper proposes an alternative approach to determine IT value that focuses on a firm's IT use in relation to its peers. This approach provides an indication of IT value without the necessity of establishing the elusive direct link between IT use and firm productivity. A model is introduced to explain the link between the industry, the firm's position within an industry, and a firm's IT focus. By understanding how IT is affecting a firm's competitive standing in relation to its peers, a better understanding of IT value can be gained.

Keywords: IT value, IT use, value chain, industry

Introduction

Understanding IT value is essential to understanding the impact of IT on business. Unfortunately, this has been an elusive objective. Research attempts to examine IT value have produced inconsistent results. This may be due to the narrow focus of most approaches, which attempt to measure IT value by examining the impact of IT at the organizational level using quantitative measures (Chan 2000). To broaden the focus and gain a better understanding of IT value, it is necessary to consider alternative approaches. This paper presents such an alternative model to evaluating IT value.

Most attempts to measure IT value have focused on factors internal to the firm such as expense ratios or productivity measures. It is likely that attempts at this level and type of measures have too many confounding variables to conclusively establish the link between IT use and IT value (Mukhopadhyay, Kekre and Kalathur 1995). An alternative approach is to consider external factors that influence a firm's IT use such as industry and firm position within an industry that could allow comparison of firm IT value to ones peers.

This paper introduces a model to explain the link between factors external to the firm and firm IT use. Specifically, this model develops a relationship between the industry, the firm's position within an industry and a firm's IT focus. IT focus (Tallon, Kraemer, and Gurbaxani, 2000) is a previously developed classification that is used in this paper as a surrogate measure for IT use. Likewise, Porter's (1985) value system is used to represent a firm's position within an industry.

This paper begins with a review of relevant literature. Next the model is discussed and propositions are presented. The paper concludes with a discussion of its contributions and suggestions for further research.

Research

This paper presents a discussion of IT value research: how it has failed to establish links between IT and business value and how the research indicates a need for new approaches to examine the issue. This section is not a complete review of IT value research. A discussion follows the research presentation that focuses on a different approach to measuring IT value that includes examining external factors such as industry and position within an industry.

Prior Research

Prior research can be reviewed by examining the three main levels of the relationship between IT use and IT value that have been manipulated in the prior research. These levels are: 1) the focus of the measure, 2) the level of the measure and 3) the measure.

Focus of the Measure

IT value research has focused on three perspectives: IT value 1) as firm profitability, 2) as consumer value and 3) as firm productivity (Hitt and Brynjolfsson, 1996) with firm productivity being the most frequently used construct (Chan 2000). These multiple approaches may be part of the reason why the research has produced inconsistent results. Hitt and Brynjolfsson (1996) concluded that while productivity, customer value and firm profitability are related; they address different questions. Productivity is measuring output; customer value is measuring increased value to the end consumer while profitability is addressing competitive advantage (Hitt and Brynjolfsson, 1996). Even when studies link IT use to increasing productivity or customer value, this does not equate to increased firm profitability (Hitt and Brynjolfsson, 1996). They suggest examining firm and industry characteristics on IT use and identifying “best practices” to differentiate a firm’s IT use from its peers.

Level of the Measurement

There have been several different levels utilized to measure IT value such as industry, organization and individual. However, most of the research has been conducted at the organizational level (Chan, 2000). Chan (2000) expressed concern with focusing on the organizational level claiming that an organization is a multidimensional entity. She argues it may not be possible to obtain a measure of the impact of IT by trying to manipulate one internal factor and then measuring productivity at the firm level. Instead, Chan (2000) suggests a multidimensional approach that includes multiple levels of analysis and multiple measures.

Additional research supports examination at levels other than the organizational level. Busch, Jarvenpaa, Tractinsky and Glick (1991) examined IT value at an industry level, suggesting that within each industry there could be differences in the use of IT. They argued that a firm’s use of IT could only be defined by its relative use within the firm’s industry. Gurbaxani and Whang (1991) as part of a study on coordination costs, conclude that information systems need to be evaluated based on a variety of dimensions, including industry characteristics. They point out that each industry may have unique characteristics that could influence how IT is used within a firm. Additionally, Bharadwaj (2000) compared key performance ratios of similar firms based on peer rankings of their IT capabilities. By using a peer comparison of IT reputations, she was able to establish a link between IT and performance.

The Measure

Chan (2000) separates the research into quantitative and qualitative measures, noting that the majority of IT value research is conducted using quantitative measures. Several studies have questioned the ability of existing measures to accurately reflect IT value. In an early attempt to link IT with enterprise level performance, Crowston and Treacy (1986) reviewed research published between 1975 and 1985. They concluded that the studies lacked adequate measures to accurately measure the relationship between IT and performance. They argue that studies that focus only on one organization lack external validity because they are not based on characteristics shared by other firms.

Mukhopadhyay et al. (1995) argue that past attempts to link IT and firm performance were inconclusive because IT is often treated as one factor making it difficult to isolate the impact of IT. This results in confounding variables that make it difficult to measure IT’s impact. Likewise, Brynjolfsson (1993) concluded that the inability to link IT and productivity is in large part due to a lack of reliable measures.

Discussion

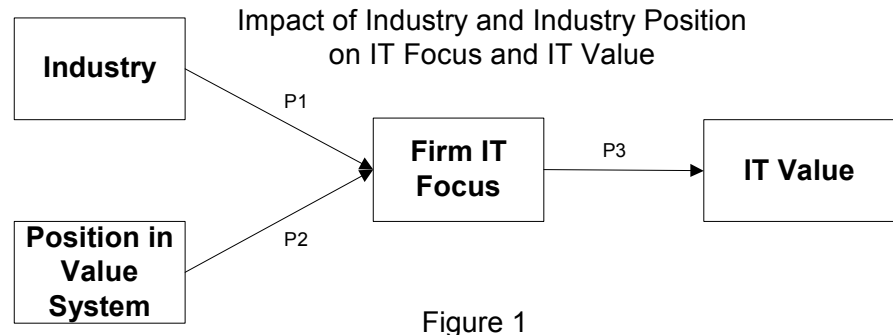
The research leads to the conclusion that there is a contribution to be made by examining factors external to the firm and their impact on IT value. Additionally, it may be beneficial to look at IT value from a qualitative perspective (Chan, 2000), specifically by creating a way to compare IT use among similar firms (Hitt and Brynjolfsson, 1996). The research further indicates that IT use as a whole may be too broad a variable and separating IT use into components may lead to better measurement (Mukhopadhyay et. al., 1995).

An approach to accomplish these objectives is to examine the relationship between the industry, a firm’s position within an industry and the firm’s use of IT. If it can be determined that a firm’s use of IT can be linked to its industry and position within the industry, a firm can examine its use of IT in comparison to its competitors. It is this comparison to ones peers that can provide an indication of the true value IT brings to a firm.

Research Model and Hypotheses

Research Model

The research model presented in figure 1 indicates that the use of IT by a firm is influenced by both the industry the firm is in and the position the firm holds within the industry. Each industry has unique characteristics that impact the way business is conducted. Likewise, the position within an industry creates unique needs that impact how the firm transacts its business. Additionally, the model indicates that how a firm aligns its IT focus in relation to its industry and position in the value system will impact the value they receive from IT.



Theoretical Development

In order to develop the model, each of the factors will be presented and discussed. Referenced theory and examples will be presented to support the factors. Additionally, propositions will be presented based on the elements of the model.

Firm IT Focus

To develop the model, a way to categorize IT use is needed. Tallon, et al. (2000), in an attempt to broaden the study of IT's impact on the firm, created categories for IT based on the firm's stated objectives and value chain processes. The result was a classification scheme based on "IT focus" that segmented IT by a company's strategic goals for IT use. They classified IT focus into four taxonomies: 1) unfocused 2) operations focused 3) market focused and 4) dual focused.

Unfocused represents the IT usage of companies that see IT as a necessary evil. They do not try to leverage IT to gain a competitive advantage; instead they tend to implement technology after it is proven and necessary for competitive survival (Tallon et al. 2000).

Operations focused represents firms that are aligning their use of IT for operating efficiencies. Firms that fall into this classification are attempting to use IT to reduce operating costs, improve quality and/or increase operating efficiency (Tallon et al. 2000).

A market-focused company is focused on using IT to better serve their customer. These companies will find ways to use IT to add value to their goods or services provided to the customer (Tallon et al. 2000).

Dual focused companies strategically strive for both operations focused and market focused approaches. Companies in this classification realize the potential for information technology and are positioned to see the greatest benefits from IT (Tallon et al. 2000).

Industry

The research indicates (Busch et al. 1991)(Gurbaxani and Whang 1991)(Broadbent, Weill and St. Clair 1999), that a firm's use of technology is impacted by the industry a firm is in. Industries have unique characteristics that impact how IT is best utilized. The point may be best illustrated by an example, comparing the automotive and financial services industries.

The manufacturing process differentiates the automotive industry. There is a lengthy supply chain with several tiers of manufacturers. The manufacturing process calls for just-in-time inventory and integration across the manufacturing process. Additionally, the distribution process requires a high degree of logistical sophistication to ship the automobiles to the dealers.

Even the dealer franchises are a unique retail structure. All these factors combine to differentiate the industry and to create unique needs for technology.

Compare this with the financial services industry. There is no manufacturing process to coordinate and no tangible product to distribute. Instead, the product is a service and the distribution process is one of disseminating information. The sales and marketing process is also different. The need for information in the selling process drives the need for technology. These factors create a different focus for IT than in the automotive industry.

The industry can play an important role in how IT is used. Different industry characteristics will result in different applications of technology and drive how a firm views its IT goals. This leads us to the first proposition:

P1: The IT focus of the firm will be influenced by the industry the firm is in

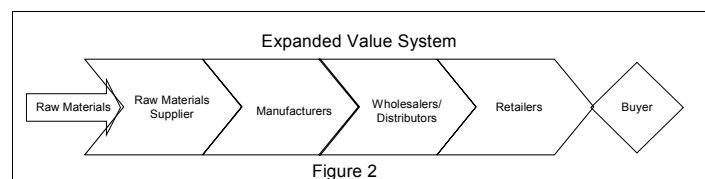
Position in the Value System

The strategy theory of Michael Porter (1985) is utilized to define a firm's position within an industry. Porter (1985) developed the value chain to separate a firm into strategic processes that could lead to competitive advantages. The value chain is the interconnected process (production, logistics, marketing, etc.) a firm uses to produce its products or services. Further, a company's internal value chain is a part of a larger process, called the value system, which includes the connection of the firm's internal value chain to the value chain of its suppliers and buyers. The value a firm adds to a product or service compounds the value added by others in this chain. This relationship can be used to demonstrate how IT use can differ based on position within an industry. Porter's original intent with the value system was not, however, to classify companies. It is necessary, therefore, to expand on the value system to allow for a more detailed classification that can provide more discrete categories.

For the purpose of this paper, the term "value system" is used as a classification schema to define the process of transforming raw materials into finished goods matched with end consumers. For our definition, suppliers include the organizations involved in transforming raw materials into a product. As a result, the supplier category of the value system is broken down into raw material suppliers and manufacturers.

The channel represents the distribution of products. For our purposes, it is divided into wholesalers/distributors and retailers. Wholesalers/distributors represent the distribution process of the product. Separate from the distribution process, retailers bring the end consumer together with the product. The buyer for our purposes represents the end consumer. See figure 2 for a representation of the adapted value system.

Our research model indicates that a firm's position within the industry will influence the role of its information technology. Just as different industries have different characteristics, so do the positions within an industry. To illustrate, consider the difference between a supplier of automobile bumpers and an automobile dealer.



The manufacturer of bumpers has a substantial amount of capital invested in equipment that has limited use outside of the manufacture of the bumpers, driving the need for technology in the production process. Additionally, customers are limited to automobile assemblers. This firm's technology can be used to tightly integrate the production process across the supply chain, building in switching costs for the scarce customers (Bensaou, 1997)(Johnston and Vitale, 1988).

Even though an automobile dealer is in the same industry as the bumper manufacturer, they do not share the same needs for IT. Automobile dealers are not concerned with the production process. Instead, they are concerned with using IT to manage shop floor inventory and sales and marketing. Thus within industries, there are different influences that can impact the focus a firm places on IT. This leads to the following proposition:

P2: The IT focus of the firm will depend on the firm's position in its industry

IT Value

Business strategy indicates that competitive advantage is gained by using IT to differentiate a firm from its competitors in a way that is not readily imitated (Hitt and Brynjolfsson, 1996)(Segars and Grover, 1995). As determined by Hitt and Brynjolfsson

(1996), it is possible that IT use can increase productivity and customer value, but not increase firm profits because the IT is available to all competitors. Firms in similar industries and value system positions will attempt to utilize IT in a fashion similar to their peers so as not to allow their peers a competitive advantage. Thus how well a firm is able to align their IT focus based upon their industry and position in the industry, will impact the value they derive from information technology. This leads to the third proposition.

P3: The alignment of IT focus with industry and industry position will impact IT value

Firm Position in the Value System and IT Focus

The research model indicates that a firm's position in the value system will impact the firm's IT focus. As raw materials are converted and additional entities add value, the complexity of the process increases, increasing the need for technology. A raw material supplier at the beginning of the value system is likely to be more simplistic in the production and logistics processes than conversion further down the value system. Therefore, it is likely that raw material suppliers are less dependent on technology. This leads to the proposition:

P4: Use of IT by the majority of Raw Material Suppliers will be classified as unfocused

As the raw materials are moved to the next step in the value system, additional value added processes are performed, increasing complexity. A manufacturer will attempt to tightly integrate with their customers, building in switching costs and focusing on efficiency. As a result, the production process is likely to emerge as the most important value added activity. This leads to the next proposition:

P5: Use of IT by the majority of manufacturers will be classified as production focused

The next step in the value system is the distribution process. This step still has a need for efficiency as the primary focus is on getting the product to where it can be matched with a consumer. However, wholesalers/distributors are more likely to have contact with multiple customers, making them also focused on marketing. Their ability to add value depends on efficiency not only in the distribution process, but also by providing additional access to customers. Technologies such as the Internet have increased the competitive pressures on wholesalers/distributors, resulting in an even greater need to utilize technology for innovation. This leads to the proposition:

P6: Use of IT by the majority of Wholesalers/Distributors will be dual focused

Once the product has been distributed to retailers, it is the job of the retailers to match the products/services with customers. Retailers are likely to have minimal production and distribution process responsibilities. Instead, the firm in a retailer position will likely need to utilize technology to match the products and services to the needs of customers. This leads to the final proposition:

P7: Use of IT by the majority of Retailers will be market focused

Discussion

This paper presents an alternative approach to assessing IT value. This approach focuses on examining a firm's IT use in relation to its peers by examining how industry and industry position impact IT focus and IT value. By understanding how the external

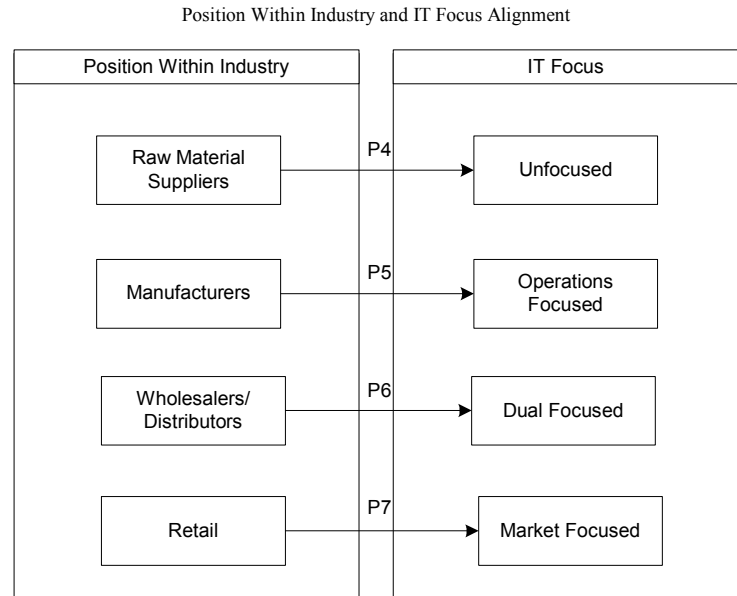


Figure 3

factors of industry and industry position of a firm impact IT use, we hope to develop a comparison level that can aid in the understanding of the value IT brings to business.

Contribution

This research provides additional tools for examining the value IT brings to business and adds to the existing body of literature by presenting a qualitative model based on factors external to the organization. This alternative approach provides an indication of IT value without the necessity of establishing the elusive direct link between IT use and firm productivity.

The research also has practical value. By comparing a company's IT use with competitors, managers can begin to understand how IT is impacting their firms competitive position. Managers can use the comparison to set strategic IT goals and to evaluate the impact that new technology will have on their organization.

Implications for Future Research

Examining the link between industry, industry position and IT focus is only the first step in developing an alternative IT value approach. The next step is to develop a more detailed classification schema to capture IT use and industry position. This is necessary to provide a comprehensive foundation that is detailed enough to be effectively utilized for comparative purposes.

Other implications for future research include the development of a more comprehensive model to explain the link between IT and firm productivity. A model can be developed to combine external factors with internal factors, providing a more accurate representation of IT value.

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